US ATLAS Phase I Upgrade

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US ATLAS Phase I Upgrade Project Meeting

Brookhaven National Laboratory

December 19-20, 2012

Outline

- Initial comments
- Recent history/chronology
- Project organization
- Major milestones for NSF proposal submission and DOE CD-1
- Elements for December 14 submission
- Requirements for NSF proposal and CD-1
- Financial guidance to subsystems
- Note on estimation of resources
- Discussion and final remarks

Initial Comments (1)

- ATLAS detector performance, and LHC physics output, have been quite impressive
- Phase I upgrades represent the first major construction effort on US ATLAS since deployment of the original device
- Phase I is designed to preserve the physics reach in the higher luminosity environment
- This initial phase is, by definition, limited in scope:
  - Approximately $44M max Total Project Cost (NSF + DOE), over ~ 5 years
  - Significant funding from operations and generic R&D being provided in FY13 and FY14

Initial Comments (2)

- Time constraints for developing a well-justified and well-documented project plan are very tight
  - NSF proposal submission February 14
  - DOE Critical Decision 1 (CD-1) review mid-April (date not finalized)
- Plans at CERN suggest a Phase II upgrade that will be much broader in scope
- The evolution of the US plans for Phase II will need to be developed concurrently with Phase I, and by many of the same people
- Nevertheless, to meet its objectives, priority for the upgrade effort right now must be to focus exclusively on launching Phase I
- There is much to do…

Recent History/Chronology (1)

- November 1: Selection of US ATLAS CPM finalized
  - US ATLAS Search Committee, Mike Tuts, Chair
  - Jon Kotcher, BNL
- November 6: first meeting with project principals on initial cost, schedule, staffing estimates and scrubbing by US ATLAS upper management
- November 9: Milestones, informed by agency deadlines, distributed to project principals
- November 17: Kotcher begins as CPM of Phase I Upgrade
  - Attended ATLAS Upgrade Week at CERN (11/19-11/23)

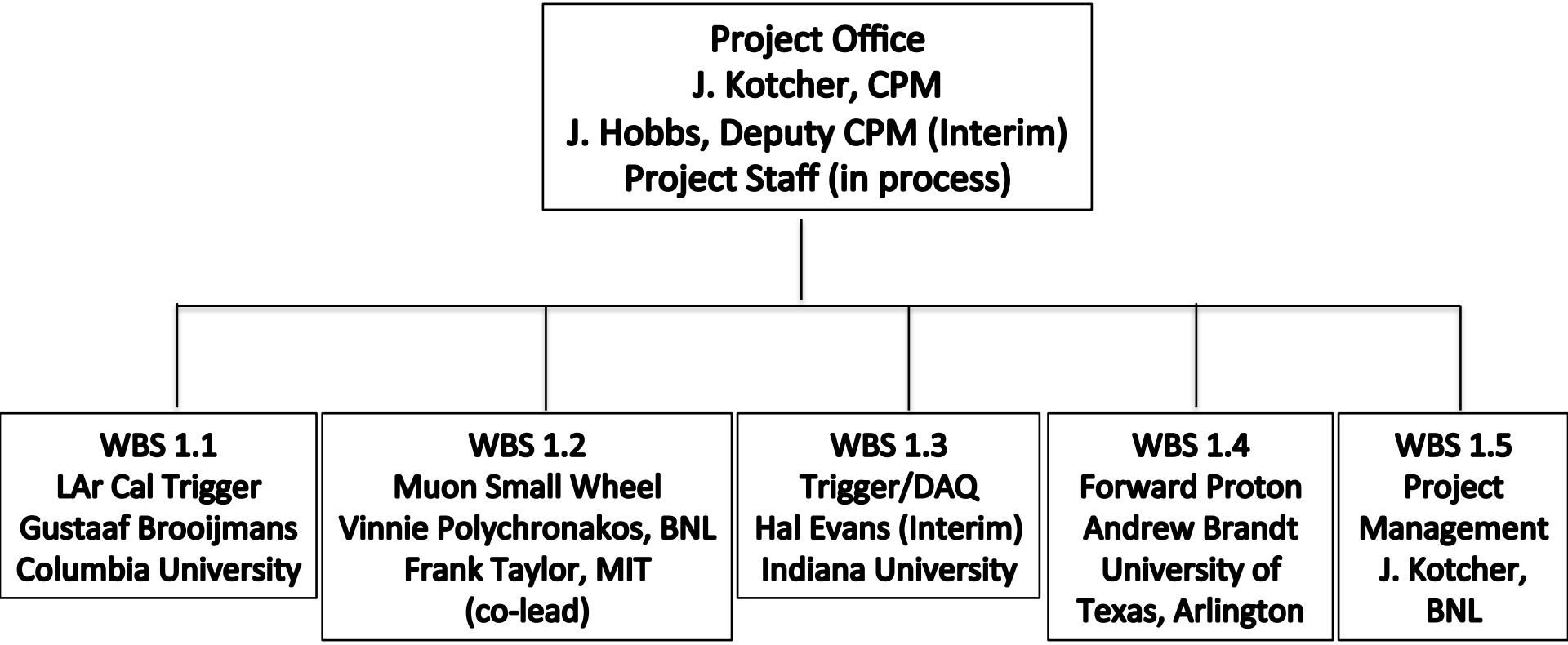
Recent History/Chronology (2)

- November 28: Selection of NSF institution for Phase I Upgrade finalized
  - US ATLAS Search Committee, Jim Pilcher, Chair
  - SUNY Stony Brook, John Hobbs, PI and Interim Deputy CPM
  - Dedicated Deputy CPM to be hired
- November 28: US ATLAS Upgrade Kick-off Meeting
  - All project principals and US ATLAS management
  - Overview, milestones
  - Status reports from project personnel, Dec 14 delivery of WBS
  - Milestones for completion of CDR, NSF proposal
  - FY13 budget allocation
  - Scoping discussions

Recent History/Chronology (3)

- November 28: Call for nominations for WBS Level 2 Project Managers through US ATLAS Institutional Board
  - Nine nominations received from 6 individuals:
    - 1 for Liquid Argon Calorimeter Trigger (LAr)
    - 3 for Muon Small Wheel (MSW)
    - 2 for Trigger/DAQ (TDAQ)
    - 3 for ATLAS Forward Proton Detector (AFP)
  - Announcement made December 7

Project Organization Through WBS Level 2



WBS Level 3 Subsystem Manager appointments will need to be made within the next few weeks

Major Milestones

- **Dec 14, 2012– first draft of WBS, including funding sources for all deliverables**
- **Dec 19-20 – internal scrubbing with project personnel and US ATLAS management at BNL**
- **Jan 11, 2013 – draft of Conceptual Design Report; draft of NSF upgrade proposal; fully loaded WBS, with backup material; all due in to upper management**
- **Jan 17-18 – independent cost, schedule and technical scrubbing by external reviewers held at SUNY Stony Brook, project personnel present**
- **Jan 30 – Feb 1 – BNL Associate Laboratory Director's (ALD) review of operations and upgrade (preparation for March 6-8 joint NSF/DOE review)**
- **Feb 8 – NSF proposal handed in to submitting institution's Grants Office**
- **March 6-7 – NSF/DOE annual review, which will include both operations and upgrade. Agencies want to understand in particular the interfaces between the two efforts, i.e., sharing of staffing, personnel, resources, etc.**
- **March 18-19 – BNL ALD review of DOE CD-1 for upgrade (preparation for mid-April CD-1 review)**
- **mid-April (to be finalized) – DOE CD-1 review. This is the latest this review can occur in order to have DOE upgrade construction funds put in to the FY14 budget**

Milestones arrived at by working backwards from agency constraints, and time scales on which funding is required

Elements Called out for Submission for December 14 Milestone

- Cost estimate (labor, material, travel) for each year, generated bottoms-up from the lowest level WBS, that meets the guidance
- Prioritized deliverables
- Prioritized input on scope if guidance for each year is increased by +20% and reduced by -20%
- List of major milestones
- Identification of NSF deliverables
  - e.g., standalone project, no funds to national laboratories, etc.

Planning Documents Required for DOE CD-1/ NSF Proposal Submission

DOE-specific:

- Project Execution Plan (PEP)
- Acquisition Strategy
- Risk Analysis and Mitigation
- Safety and Hazard Analysis
- Quality Assurance (QA)
- National Environmental Policy Act (NEPA)
- Integrated Project Management Team (IPMT)

Guidelines will be provided and discussed at this meeting

Both Agencies:

- Conceptual Design Report (CDR), science and technical case
- Cost, Schedule, Staffing Estimates
- Bottoms-up risk-based contingency estimates (deliverable level)
- WBS Dictionary & Basis of Estimate (BOE)
- Cost books

blue = project personnel are principals in drafting

Financial Guidance Provided to Subsystems

- Agencies have provided guidance (for planning purposes):
  - $10M NSF, $34M DOE, funding FY13-17
- Based on this, management distributed guidance to project principals for use in developing the base estimates for their subsystems (mid-Nov)
- Based on a number of factors, including (not priority-ordered):
  - Initial plan submitted by and vetted with project principals
  - History and nature of past US ATLAS technical role
  - Estimated amount of total project contingency that will be needed, based on agency guidance for a project at this stage (~ 40%)
  - Priority of physics goals subsystem upgrade will address
  - Overall scope that can be accommodated within financial constraints

Deliverables must describe a coherent, self-contained and "trackable" project plan for each agency

Notes on the Guidance

- Project completed in 2018, which also contains schedule float
- installation and commissioning is not part of project scope
  - Project complete when deliverables are on loading dock at CERN
- NSF/DOE split will be determined after we have a nominal project scope, which is not yet in hand
- No project construction funds from either agency can be expended until ATLAS upgrade approvals are obtained (~ fall 2013)
  - Development and prototyping only until then
  - Support from operations and R&D in FY13 and FY14

Near-term Pre-Construction Funding

- DOE provided $1M in project funds provided this fiscal year, another $1M promised
- First $1M has been allocated and distributed to the project
- As we are not yet approved for construction, these are classified as Other Project Costs (OPC): development funds
- It is possible that some funds will also be provided by NSF at end of fiscal year, depending on their availability and project approval status
- All of the above funds will be counted against the project's ~ $44M bottom line
- Additional support in FY13 (and FY14) provided by operations and generic R&D programs does not count against this total

Note on Estimating

- Your project plan should describe what you believe you will need to complete the scope of work you are putting forward
  - Cost, schedule, staffing estimates should reflect this "base" need - no more, no less
- Contingency is handled separately from the base estimate
- Each subsystem will develop a risk-based contingency estimate, with final contingency set by Project Office.
- It is ultimately a lump sum, and not subsystem-specific
- Contingency is held by the Project Office

Discussion (1)

- Phase I upgrades are a targeted series of technical improvements designed to best exploit the physics in the post-shutdown running environment
- They are, by both design and necessity, limited in scope
- The project plan must be concrete, well-justified, and supported by required backup documentation that adequately buttresses the case

Discussion (4)

- For a variety of reasons, the US LHC detector upgrades are proceeding on a highly compressed schedule
- Scope is still fluid, particularly at this late stage in the approval process
- We believe that, given our late start, this is unavoidable – despite the time scales, scope definition at this juncture is an essential precursor for all that follows
- However, this must converge quickly if we are to deliver what is required on the relevant time frame
- Remember, this is very different from an R&D effort: in order to obtain the necessary funding, the upgrade and its deliverables must be extremely well-defined

Discussion (2)

- Final ATLAS upgrade definition and approvals will lag our own approval process
- Due to events well beyond our control, modifications of the US scope may well be necessary after initial agency approvals are obtained
- This is an intrinsic feature of such an asynchronous international approval process
- The agencies have been aware of this situation as they established the upgrade timeline, and are working with us with this in mind

Discussion (3)

- A well-articulated narrative motivating our chosen scope and describing the adaptability of our approach will be an important element of our case for approval
- The project as a whole must understand, buy in to, and be able to speak to this narrative during the review process
- We consider any dissension in private as fair game. Time scales demand that we air disagreements quickly, and take decisions in a timely way. We will do that.
- But for all external reviews, it is essential that the project speak as one, unified and coherent voice. This is part of the basis upon which we will be evaluated.

Final Remarks

- Much work lies before us: generating well-considered and defensible plans in a very short time
- The agencies will want to see that the project personnel have taken ownership of their subsystems
- This requires shifting one's thinking into "project mode"
- We each have well-defined roles and responsibilities; working together cooperatively will be key to realizing our goals
- Maintaining the proper balance and perspective will be increasingly important as the work intensifies
- Please keep this in mind as we pull this upgrade through the coming few months and beyond

Agenda Today

- 8:30 – 10:30 General discussion (Kotcher, All)
- 10:30 – 11:00 Break
- 11:00 – 12:30 LAr (Brooijmans)
- 1:30 – 2:30 LAr (cont'd)
  - Kotcher presentation, scheduled for 12:50 – 1:20
- 3:30 – 5:30 AFP (Brandt)
- 6:30 Dinner